

SEQUENCE LISTING

- (1) GENERAL INTORMATION:
 - (i) APPLICANT: Adair, John R.
 Athwal, Diljeet S.
 Emtage, John S.
 - (ii) TITLE OF INVENTION: Humanised Antibodies
 - (iii) NUMBER OF SEQUENCES: 30
 - (iv) CORRESPONDENCE ADDRESS:
 - (A) ADDRESSEE: Woodcock Washburn Kurtz Mackiewicz & Norris
 - (B) STREET: One Liberty Place 46th Floor
 - (C) CITY: Philadelphia
 - (D) STATE: PA
 - (E) COUNTRY: USA
 - (F) ZIP: 19103
 - (v) COMPUTER READABLE \FORM:
 - (A) MEDIUM TYPE: Floppy disk
 - (B) COMPUTER: IBM PC compatible
 - (C) OPERATING SYSTEM:\ PC-DOS/MS-DOS
 - (D) SOFTWARE: PatentIn Release #1.0, Version #1.25
 - - (A) APPLICATION NUMBER: US 08/846,658
 - (B) FILING DATE: 01-MAY-1\(97
 - (C) CLASSIFICATION:
 - (viii) ATTORNEY/AGENT INFORMATION:
 - (A) NAME: Trujillo, Doreen Yatko
 - (B) REGISTRATION NUMBER: 35,719
 - (C) REFERENCE/DOCKET NUMBER: CARP-0057
 - (ix) TELECOMMUNICATION INFORMATION
 - (A) TELEPHONE: (215) 568-3100
 - (B) TELEFAX: (215) 568-3439
- (2) INFORMATION FOR SEQ ID NO:1:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 20 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

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4

	(ii)	MOLECULE TYPE: CDNA	
	, ,		
	(xi)	SEQUENCE DESCRIPTION: SEQ ID NO:1:	
TCC	AGATO	GTT AACTGCTCAC	20
(2)	INFOR	RMATION FOR SEQ TO NO:2:	
	(i)	SEQUENCE CHARACTERISTICS: (A) LENGTH: 23 base pairs (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear	
	(ii)	MOLECULE TYPE: dDNA	
	(xi)	SEQUENCE DESCRIPTION: SEQ ID NO:2:	
CAG	GGGC	CAG TGGATGGATA GAC	23
(2)	INFOR	RMATION FOR SEQ ID NO:3:	
	(i)	SEQUENCE CHARACTERISTICS: (A) LENGTH: 9 amino acids (B) TYPE: amino acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear	
ار کا	(ii)	MOLECULE TYPE: peptide \	
0			
	(xi)	SEQUENCE DESCRIPTION: SEQ TO NO:3:	
Leu 1	Glu	Ile Asn Arg Thr Val Ala Ala 5	
(2)	INFOR	RMATION FOR SEQ ID NO:4:	
	(i)	SEQUENCE CHARACTERISTICS: (A) LENGTH: 943 base pairs (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear	
	(ii)	MOLECULE TYPE: cDNA	

		(ix)	FEAT (A) (B)	IAN	ØE√KI	EY: C		722								
		(ix)	FEAT (A) (B)	NAN	∕iE/k\Į	ΣΥ: π Ν: ε			ide							
		(xi)	SEÇ	QUENC	CE DI	SSCRI	PTIC	ON: S	SEQ	ID	NO:4	l:				
	GAA'	TTCC	CAA A	AGACI	ľ		Asp I		CAA (Gln V			[le]				0
		ATC Ile													9	8
		TCT Ser													14	6
		TGC Cys													19	!4
		TCA Ser													24	2
t		TCT Ser 55													29	0
		TCT Ser													33	8
		TGC Cys													38	6
		TTG Leu													43	4
		CCA Pro													48	2

Di

					TAC Tyr											530
					CAA Gln 155											578
					ACC Thr											626
					CGA Arg											674
					CCC Pro			Į⁄уs					Asn			722
TAGA	AGACA	AAA (GTC	CTGA	GA CO	CCA	CCAC	C AG	CTCC	CAGC	TCC	ATCC:	TAT	CTTC	CCTTCT	782
AAGO	TCT	rgg A	AGGC".	TCC	CC A	CAAG	CGCT	r ac) CACTO	GTTG	CGG'	TGCT(CTA A	AACC:	rcctcc	842
CAC	CTCC	TTC :	CCT	CCTC	CT CO	CCTT	rcct:	r gg(CT ['] TT	ratc	ATG	CTAA!	rat :	rtgcz	AGAAAA	902
TATI	CAA:	ΓΑΑ Α	AGTGA	AGTC'	rt to	GCT'	rgaa <i>i</i>	A AA	AAAA	AAAA	A			-		943

(2) INFORMATION FOR SEQ ID NO:5:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 235 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: protein
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

Met Asp Phe Gln Val Gln Ile Phe Ser Phe Leu Leu Leu Leu Ser Ala Ser -22 -20 -15 -10

Val Ile Ile Ser Arg Gly Gln Ile Val Leu Thr Gln Ser Pro Ala Ile
-5 1 5 10

Met Ser Ala Ser Pro Gly Glu Lys Val Thr Met Thr Cys Ser Ala Ser

Ser Ser Val Ser Tyr Met Asn Trp Tyr Gln Gln Lys Ser Gly Thr Ser

Pro Lys Arg Trp Ile Tyr Asp Thr Ser Lys Leu Ala Ser Gly Val Pro
45 50 55

Ala His Phe Arg Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile
60 70

Ser Gly Met Glu Ala Glu\Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp
75 80 85 90

Ser Ser Asn Pro Phe Thr Phe Gly Ser Gly Thr Lys Leu Glu Ile Asn 95 \ 100 105

Arg Ala Asp Thr Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu

Gln Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe 125 130 135

Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg

Gln Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser 155 160 165 170

Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu 175 180 185

Arg His Asn Ser Tyr Thr Cys Glu Ala\Thr His Lys Thr Ser Thr Ser 190 195\ 200

Pro Ile Val Lys Ser Phe Asn Arg Asn Glu Cys

(2) INFORMATION FOR SEQ ID NO:6:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 1570 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 41..1444

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1	(ix)	FEATURE	:

(A) NAME/KEY: mat_peptide (B) LOCATION: 98..1444

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

		(X)	L) SE	QUEN	ICE I	ESC	(TPT)	ON:	SEÇ	מד נ	NO: 6) :					
1	GAAT	TCCC	CCT (CTCCA	ACAGA	AC AC	CTGAA	AACT	CTC	SACTO	CAAC				CAC His		55
															CAG Gln 1	Val	103
	CAG Gln	CTG Leu	CAG Gln 5	CAG Gln	TCT Ser	GGG Gly	GCT Ala	GAA Glu \ 10	CTG Leu	GCA Ala	AGA Arg	CCT Pro	GGG Gly 15	GCC Ala	TCA Ser	GTG Val	151
	AAG Lys	ATG Met 20	TCC Ser	TGC Cys	AAG Lys	GCT Ala	TCT Ser 25	GGC Gly	TAC Tyr	ACC Thr	TTT Phe	ACT Thr 30	AGG Arg	TAC Tyr	ACG Thr	ATG Met	199
															GGA Gly		247
															AAG Lys 65		295
															ATG Met		343
	CTG Leu	AGC Ser	AGC Ser 85	CTG Leu	ACA Thr	TCT Ser	GAG Glu	GAC Asp 90	TCT Ser	GCA Ala	GTC Val	TAT Tyr	TAC Tyr 95	TGT Cys	GCA Ala	AGA Arg	391
															ACC Thr		439
															CCA Pro		487

		GAT Asp							535
		T/TC Phe							583
		GGT Gly							631
		AGC Ser							679
		ACC Thr 200							727
		ATT Ile							775
		CCA Pro							823
		AAG Lys							871
		GTG Val						·	919
		TTT Phe 280							967
		GAG Glu						<u>:</u>	1015
		CAC His						:	1063
		AAA Lys						:	1111

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					1												
														GTC Val			1159
														ACC Thr			1207
						L L								ACC Thr			1255
														CTG Leu 400			1303
														AAG Lys			1351
														GAG Glu			1399
_								١ .						GGT Gly			1444
	TGAC	GCTCA	AGC A	ACCC	ACAA	AA C	CTC	AGGT(CAZ	AAGA	GACA	CCCZ	ACAC'	rca :	CTC	CATGCT	1504
	TCC	CTTGT	TAT A	AAAT	AAAG	CA CO	CCAG	CAATO	g det	rggg <i>i</i>	ACCA	TGT	AAAA	AAA A	AAAA	AAAAAG	1564
	GAAT	TTC							\	\							1570

- (2) INFORMATION FOR SEQ ID NO: 7:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 468 amino acids
 (B) TYPE: amino acid

 - (C) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: protein
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

Met Glu Arg His Trp Ile Phe Leu Leu Leu Leu Şer Val Thr Ala Gly -15 -19 -10 -5

Val His Ser Gln Val Gl\u03b2 Leu Gln Gln Ser Gly Ala Glu Leu Ala Arg Pro Gly Ala Ser Val Lys\Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe 15 Thr Arg Tyr Thr Met His Ṭrp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Phe Lys Asp Lys Ala\Thr Leu Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp 100 Gly Gln Gly Thr Thr Leu Thr Val Ser Ser Ala Lys Thr Thr Ala Pro 115 120 Ser Val Tyr Pro Leu Ala Pro Val Cy's Gly Asp Thr Thr Gly Ser Ser 135 Val Thr Leu Gly Cys Leu Val Lys Gly Thr Phe Pro Glu Pro Val Thr 150 145 Leu Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu \Ser Ser Ser Val Thr Val 180 185 Thr Ser Ser Thr Trp Pro Ser Gln Ser Ile Thr Cys Asn Val Ala His 200 205 190 195 Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Glu Pro Arg Gly Pro 210 215 Thr Ile Lys Pro Cys Pro Pro Cys Lys Cys Pro Ala Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro Lys Ile\Lys Asp Val Leu 240 250 Met Ile Ser Leu Ser Pro Ile Val Thr Cys Val Val Val Asp Val Ser 255 260 265

DI

Glu Asp Asp Pro Asp Val Gln Ile Ser Trp Phe Val Asn Asn Val Glu 285

Val His Thr Ala Gln Thr Gln Thr His Arg Glu Asp Tyr Asn Ser Thr 290

Leu Arg Val Val Ser Ala Leu Pro Ile Gln His Gln Asp Trp Met Ser 310

Gly Lys Glu Phe Lys Cys Lys Val Asn Asn Lys Asp Leu Pro Ala Pro 320

Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly Ser Val Arg Ala Pro Gln 335

Val Tyr Val Leu Pro Pro Glu Glu Glu Met Thr Lys Lys Gln Val 350

Thr Leu Thr Cys Met Val Thr Asp Phe Met Pro Glu Asp Ile Tyr Val

Glu Trp Thr Asn Asn Gly Lys Thr Glu Leu Asn Tyr Lys Asn Thr Glu 385 390 395

Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe Met Tyr Ser Lys Leu Arg

Val Glu Lys Lys Asn Trp Val Glu Arg Àsn Ser Tyr Ser Cys Ser Val 415 420 425

Val His Glu Gly Leu His Asn His His Thr Lys Ser Phe Ser Arg 430 435 440 445

Thr Pro Gly Lys

(2) INFORMATION FOR SEQ ID NO:8:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 85 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: peptide
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly

5 10 15

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Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Asp Ile Ile Lys Tyr 20 25 30

Leu Asn Trp Tyr Gln Gln Thr Pro Gly Lys Ala Pro Lys Leu Leu Ile.

Thr Glu Ala Ser Asn Leu Gln Ala Gly Val Pro Ser Arg Phe Ser Gly
50 60

Ser Gly Ser Gly Thr Asp \backslash Tyr Thr Phe Thr Ile Ser Ser Leu Gln Pro 65 75 80

Glu Asp Ile Ala Thr 85

- (2) INFORMATION FOR SEQ ID NO:9:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 23 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 9:

Tyr Tyr Cys Gln Gln Tyr Gln Ser Leu Pro Tyr Thr Phe Gly Gln Gly
1 5 10 15

Thr Lys Leu Gln Ile Thr Arg
20

- (2) INFORMATION FOR SEQ ID NO:10:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 126 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: peptide
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg

Ser Leu Arg Leu Ser Cys Ser Ser Ser Gly Phe Ile Phe Ser Ser Tyr
20 25 30

Ala Met Tyr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val 35 40 45

Ala Ile Ile Trp Asp Asp Gly Ser Asp Gln His Tyr Ala Asp Ser Val
50 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Phe 75 80

Leu Gln Met Asp Ser Leu Arg Pro Glu Asp Thr Gly Val Tyr Phe Cys
85 90 95

Ala Arg Asp Gly Gly His Gly Phe Cys Ser Ser Ala Ser Cys Phe Gly 100 \ 105 110

Pro Asp Tyr Trp Gly Gln Gly\Thr Pro Val Thr Val Ser Ser

(2) INFORMATION FOR SEQ ID NO: 11:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 119 amino àcids
 - (B) TYPE: amino acid
 - (C) TOPOLOGY: linear
- (ii) MOLECULE TYPE: peptide
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 11:

Gln Val Gln Leu Val Glu Ser Gly Gly Val Val Gln Pro Gly Arg
5 \10 15

Ser Leu Arg Leu Ser Cys Ser Ser Ser Gly Tyr Thr Phe Thr Arg Tyr 20 25 \ 30

Thr Met His Trp Val Arg Gln Ala Pro Gly\Lys Gly Leu Glu Trp Val
35 40 45

Ala Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Phe
50 55 60

Lys Asp Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Phe 70 75 \ 80

Leu Gln Met Asp Ser Leu Arg Pro Glu Asp Thr Gly Val Tyr Phe Cys
85 90 95

CAL

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly

Thr Thr Leu Thr Val Ser Ser

- (2) INFORMATION FOR SEQ ID NO:12:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 119\ amino acids
 - (B) TYPE: amino \ acid
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: peptide
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

Gln Val Gln Leu Val Gln Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 10 15

Ser Leu Arg Leu Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Arg Tyr 20 30

Thr Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Val

Lys Asp Arg Phe Thr Ile Ser Thr Asp Lys Ser Lys Ser Thr Ala Phe 70 75 80

Leu Gln Met Asp Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys
85 90\ 95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly

Thr Thr Leu Thr Val Ser Ser 115

- (2) INFORMATION FOR SEQ ID NO:13:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 119 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

Gln Val Gln Leu Val Gla Ser Gly Gly Gly Val Val Gln Pro Gly Arg 1 10 15

Ser Leu Arg Leu Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Arg Tyr
20 25 30

Thr Met His Trp Val Arg\Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile 35 40 45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Val 50 55 60

Lys Asp Arg Phe Thr Ile Ser Thr Asp Lys Ser Lys Ser Thr Ala Phe 65 70 75 80

Leu Gln Met Asp Ser Leu Arg Pro Glu Asp Thr Gly Val Tyr Phe Cys
85 90 95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Thr Leu Thr Val Ser Ser 115

(2) INFORMATION FOR SEQ ID NO:14:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 119 amino\ acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

Gln Val Gln Leu Val Gln Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 10 \ 15

Ser Leu Arg Leu Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Arg Tyr
20 25 30

Thr Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn \Tyr Asn Gln Lys Val
50 55 60

DIT

Lys Asp Arg Phe Thr Ne Ser Thr Asp Lys Ser Lys Asn Thr Ala Phe 70 75 80

Leu Gln Met Asp Ser Leu Arg Pro Glu Asp Thr Gly Val Tyr Phe Cys 85 90 95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Thr Leu Thr Val Ser Ser

(2) INFORMATION FOR SEQ\ID NO:15:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 119\amino acids
 - (B) TYPE: amino \acid
 - (D) TOPOLOGY: linear

MOLECULE TYPE: pept\de

 $V(\mathrm{xi})$ SEQUENCE DESCRIPTION: SEQ ID NO:15:

Gln Val Gln Leu Val Gln Ser Gly Gly Val Val Gln Pro Gly Arg
1 10 15

Ser Leu Arg Leu Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Arg Tyr 20 25 \ 30

Thr Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile 35 40 45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Val
50 60.

Lys Asp Arg Phe Thr Ile Ser Arg Asp Asn\Ser Lys Asn Thr Ala Phe 70 \75 80

Leu Gln Met Asp Ser Leu Arg Pro Glu Asp Thr Gly Val Tyr Phe Cys
85 90 \ 95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Thr Leu Thr Val Ser Ser 115

(2) INFORMATION FOR SEQ ID NO:16:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 119 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: peptide
- (xi) SEQUENCE DESCRİPTION: SEQ ID NO:16:

Gln Val Gln Leu Val Gln Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Arg Tyr
20 25 30

Thr Met His Trp Val Arg Gln Ala Pro Cys Lys Gly Leu Glu Trp Ile 35 $40\$

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Val
50 55 60

Lys Asp Arg Phe Thr Ile Ser Thr Asp Lys Ser Lys Asn Thr Leu Phe 70 75 80

Leu Gln Met Asp Ser Leu Arg Pro Glu Asp Thr Gly Val Tyr Phe Cys 85 90 95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
100 105 \ 110

Thr Thr Leu Thr Val Ser Ser 115

- (2) INFORMATION FOR SEQ ID NO: 17:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 119 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: peptide
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 17:

Gln Val Gln Leu Val Gln Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 10 15

Ser Leu Arg Leu Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Arg Tyr 20 25 30

Thr Met His Trp Val Arg Gln Ala Pro Cys Lys Gly Leu Glu Trp Ile 35 40 45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Val 50 60

Lys Asp Arg Phe Thr Ile\Ser Arg Asp Asn Ser Lys Asn Thr Leu Phe 70 75 80

Leu Gln Met Asp Ser Leu Arg Pro Glu Asp Thr Gly Val Tyr Phe Cys
85 90 95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Thr Leu Thr Val Ser Ser

(2) INFORMATION FOR SEQ ID NO:18:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 119 amino \acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

Gln Val Gln Leu Val Gln Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 10 15

Ser Leu Arg Leu Ser Cys Lys Ala Ser Gly\Tyr Thr Phe Thr Arg Tyr 20 25 30

Thr Met His Trp Val Arg Gln Ala Pro Cys Lys Gly Leu Glu Trp Val
35 40 45

Ala Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Val

Lys Asp Arg Phe Thr Ile Ser Thr Asp Lys Ser Thr Ala Phe 70 75 \ 80

Leu Gln Met Asp Ser Leu Arg Pro Glu Asp Thr Gly Val Tyr Phe Cys
85 90 95

Cont

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Thr Leu Thr Val Ser Ser

- (2) INFORMATION FOR SEQ ID NO:19:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 119 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: peptide
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

Gln Val Gln Leu Val Gln Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 10 15

Ser Leu Arg Leu Ser Cys Ser Ala\Ser Gly Tyr Thr Phe Thr Arg Tyr
20 30

Thr Met His Trp Val Arg Gln Ala Pro Cys Lys Gly Leu Glu Trp Ile 35 40 45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr\Thr Asn Tyr Asn Gln Lys Val

Lys Asp Arg Phe Thr Ile Ser Thr Asp Lys Ser Lys Ser Thr Ala Phe 70 75 80

Leu Gln Met Asp Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Thr Leu Thr Val Ser Ser 115

- (2) INFORMATION FOR SEQ ID NO:20:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 119 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: peptide

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg 15

Ser Leu Arg Leu Ser Cys Ser Ala Ser Gly Tyr Thr Phe Thr Arg Tyr 25

Thr Met His Trp Val Arg Gln Ala Pro Cys Lys Gly Leu Glu Trp Ile 45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Val 50

Lys Asp Arg Phe Thr Ile Ser Thr Asp Lys Ser Lys Ser Thr Ala Phe 80

Leu Gln Met Asp Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys 85

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly 105

Thr Thr Leu Thr Val Ser Ser 115

(2) INFORMATION FOR SEQ ID NO:21:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 119 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg 1 5 10 \ 15

Ser Leu Arg Leu Ser Cys Ser Ser Ser Gly Tyr Thr Phe Thr Arg Tyr
20 25 30

Thr Met His Trp Val Arg Gln Ala Pro Cys Lys Gly Leu Glu Trp Ile 35 40 45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Val
50 55 60

DA -

Lys Asp Arg Phe Thr the Ser Thr Asp Lys Ser Lys Ser Thr Ala Phe 75 . 80

Leu Gln Met Asp Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly 100 105 110

Thr Thr Leu Thr Val Ser Ser

(2) INFORMATION FOR SEQ ID NO:22:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 119 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

Gln Val Gln Leu Val Gln Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 15

Ser Leu Arg Leu Ser Cys Ser Ala Ser Gly Tyr Thr Phe Thr Arg Tyr 20 25 30

Thr Met His Trp Val Arg Gln Ala Pro Cys Lys Gly Leu Glu Trp Ile 35 40 \ 45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Val
50 55 60

Lys Asp Arg Phe Thr Ile Ser Thr Asp Lys Ser Lys Ser Thr Ala Phe 75 80

Leu Gln Met Asp Ser Leu Arg Pro Glu Asp Thr Gly Val Tyr Phe Cys 85 90 \ 95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Thr Leu Thr Val Ser Ser

(2) INFORMATION FOR SEQ \ ID NO:23:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 119 \ amino acids
 - (B) TYPE: amino àcid
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: peptide
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

Gln Val Gln Leu Val Glu Ser Gly\Gly Gly Val Val Gln Pro Gly Arg
1 10 15

Ser Leu Arg Leu Ser Cys Ser Ala Ser Gly Tyr Thr Phe Thr Arg Tyr
20 25 30

Thr Met His Trp Val Arg Gln Ala Pro Cys Lys Gly Leu Glu Trp Ile 35 40 \ 45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr \Thr Asn Tyr Asn Gln Lys Val
50 60

Lys Asp Arg Phe Thr Ile Ser Thr Asp Lys Ser Lys Ser Thr Ala Phe 70 75 80

Leu Gln Met Asp Ser Leu Arg Pro Glu Asp Thr Gly Val Tyr Phe Cys
85 90 \ 95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly
100 105 \ 110

Thr Thr Leu Thr Val Ser Ser 115

(2) INFORMATION FOR SEQ ID NO:24:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 119 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: peptide

Con

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

Gln Val Gln Leu Val Gln Ser\Gly Gly Gly Val Val Gln Pro Gly Arg
1 10 15

Ser Leu Arg Leu Ser Cys Ser Ala Ser Gly Tyr Thr Phe Thr Arg Tyr
20 25 30

Thr Met His Trp Val Arg Gln Ala\Pro Cys Lys Gly Leu Glu Trp Ile
35 40\
45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Val
50 60

Lys Asp Arg Phe Thr Ile Ser Thr Asp Lys Ser Lys Ser Thr Ala Phe 75 75 80

Leu Gln Met Asp Ser Leu Arg Pro Glu Asp Thr Gly Val Tyr Phe Cys 85 90 95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Led Asp Tyr Trp Gly Gln Gly
100 105 \ 110

Thr Thr Leu Thr Val Ser Ser 115

(2) INFORMATION FOR SEQ ID NO:25:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 107 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLoGY: linear
- (ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 10 15

Asp Arg Val Thr Ile Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met 20 25 30

Asn Trp Tyr Gly Gln Thr Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr 35 40 45

Asp Thr Ser Lys Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly Ser 50 60

DI

Gly Ser Gly Thr Asp Tyr Thr Phe Thr Ile Ser Ser Leu Gln Pro Glu
65 70 75 80

Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Phe Thr

85 90 95

Phe Gly Gln Gly Thr Lys Leu Gln Ile Thr Arg

(2) INFORMATION FOR SEQ ID NO:26:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 107\ amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: peptide
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

Gln Ile Val Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 10 15

Asp Arg Val Thr Ile Thr Cys Ser Ala\Ser Ser Ser Val Ser Tyr Met 20 25 30

Asn Trp Tyr Gln Gln Thr Pro Gly Lys Ala Pro Lys Arg Trp Ile Tyr
35 40 45

Asp Thr Ser Lys Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly Ser

Gly Ser Gly Thr Asp Tyr Thr Phe Thr Ile \Ser Ser Leu Gln Pro Glu
65 70 75 80

Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Phe Thr 85 90 \ 95

Phe Gly Gln Gly Thr Lys Leu Gln Ile Thr Arg

(2) INFORMATION FOR SEQ ID NO:27:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 107 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: peptide

On

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

Gln Ile Val Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 10 15

Asp Arg Val Thr Ile Thr dys Ser Ala Ser Ser Ser Val Ser Tyr Met 20 25 30

Asn Trp Tyr Gln Gln Thr Pro Gly Lys Ala Pro Lys Arg Trp Ile Tyr 35 40 45

Asp Thr Ser Lys Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly Ser 50 60

Gly Ser Gly Thr Asp Tyr Thr Phe Thr Ile Ser Ser Leu Gln Pro Glu
65 70 75 80

Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Phe Thr 85 90 95

Phe Gly Gln Gly Thr Lys Leu Gln Ile Thr Arg

(2) INFORMATION FOR SEQ ID NO:28:

- (i) SEQUENCE CHARACTERISTICS
 - (A) LENGTH: 107 amino \acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: peptide
- (xi) SEQUENCE DESCRIPTION: SEQ ID\NO:28:

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Led Ser Ala Ser Val Gly

1 10 15

Asp Arg Val Thr Ile Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met
20 25 30

Asn Trp Tyr Gln Gln Thr Pro Gly Lys Ala Pro Lys Arg Trp Ile Tyr 35 40 45

Asp Thr Ser Lys Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly Ser 50 60 \

Gly Ser Gly Thr Asp Tyr Thr Phe Thr Ile Ser Ser Leu Gln Pro Glu
65 70 75 80

Don't

Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Phe Thr 85 90 95

Phe Gly Gln Gly Thr Lys Leu Gln Ile Thr Arg 100 105

- (2) INFORMATION FOR SEQ ID NO:29
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH:\ 107 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE \ peptide
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:29

Gln Ite Val Leu Thr Gln Ser Pro Ala Ile
1 5 10

Met Ser Ala Ser Pro Gly Glu Lys\ Val Thr Met Thr Cys Ser Ala Ser 15 20 25

Ser Ser Val Ser Tyr Met Asn Trp Tyr Gln Gln Lys Ser Gly Thr Ser 30 35 40

Pro Lys Arg Trp Ile Tyr Asp Thr Se'r Lys Leu Ala Ser Gly Val Pro
45 50 \ 55

Ala His Phe Arg Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile 60 65 70

Ser Gly Met Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp
75 80 85 90

Ser Ser Asn Pro Phe Thr Phe Gly Ser Gly Thr Lys Leu Glu Ile Asn 95 100 105

Arg

- (2) INFORMATION FOR SEQ ID NO:30
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 119 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:30

Gln Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Ala Arg
10

Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe
20

Thr Arg Tyr Thr Met His Trp Val Lys Gln Arg Pro Gly Gln Gly Leu
30

Glu Trp Ile Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn
55

Glu Lys Phe Lys Asp Lys Ala Thr Leu Thr Thr Asp Lys Ser Ser Ser
75

Thr Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val
85

Gly Gln Gly Thr Thr Leu Thr Val Ser Ser
110

GY 11